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PATENT

Attorney Docket No. MTI-31041

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Ping, et al.  
Serial No. : 09/816,962  
Filing Date : March 23, 2001  
For : Method For Forming Raised Structures by Controlled  
Selective Epitaxial Growth of Facet Using Spacer  
Group Art Unit : 2812  
Examiner : A. Roman  
Confirmation No. : 8677

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## CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

I hereby certify that, on the date shown below, this correspondence is being:

## Mailing

- ☒ deposited with the United States Postal Service in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

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## Transmission

- ☒ transmitted by facsimile to Fax No. 703-872-9318 addressed to Examiner Angel Roman at the US Patent and Trademark Office.

Date: April 9, 2002Jim B. Houk

4 pages

Assistant Commissioner for Patents  
Washington, D.C. 20231

## SUPPLEMENTAL RESPONSE TO RESTRICTION REQUIREMENT

Sir:

This is in response to the Examiner's action mailed March 26, 2002, in the above-identified patent application.

The Examiner indicated that Applicant's listing of readable claims on the elected Specie 3, Figures 2A-2F, was not clear since Figures 1H, 2F and 3C represent patentably distinct species.

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*Supplemental Response to Restriction*

First of all, Applicant clarifies that the following claims are readable on Group iii, Specie 3 (FIGS. 2A-2F): independent Claims 1, 46, 47, 48, 58, 60, 61 and 72, and dependant Claims 2-43, 49, 59, 62-71 and 73-78.

FIG. 2F is an example of a structure resulting from an embodiment of a method of the invention in which a gate and adjacent source/drain structures are fabricated by selective epitaxial growth on a surface of a semiconductive substrate. Claims 1-43, 46-49 and 58-78 (e.g., method of forming a vertical structure on a substrate) relate to this embodiment of a method of the invention.

It is submitted that Applicant's listing of readable claims (Claims 1-43, 46-49 and 58-78) on the elected specie 3 is clear.

Applicant again notes that the election of species is for the purpose of prosecution on the merits, and that Applicant will be entitled to consideration of claims to additional species upon allowance of a generic claim.

It is noted that Claims 1-43, 46-49 and 58-78 are generic to all embodiments of the method of the invention, and are readable on the remaining non-elected Specie Groups i, ii and iv.

Claims 1-43, 46-49 and 58-78 are directed to methods of forming a vertical structure on a substrate by controlled selective epitaxial growth. The structures are formed by selectively growing an initial epitaxial layer of monocrystalline silicon on the surface of a semiconductive substrate, and forming a thin film of insulative material over the epitaxial layer. A portion of the insulative layer is removed to expose the top surface of the epitaxial layer, with the insulative material remaining along the sidewalls as spacers to prevent lateral growth. A second epitaxial layer is selectively grown on the exposed surface of the initial epitaxially grown crystal layer, and a thin insulative film is deposited over the second epitaxial layer. Additional epitaxial layers are added as desired to provide a vertical structure of a desired height comprising multiple layers of single silicon crystals, each epitaxial layer have insulated sidewalls, with the uppermost epitaxial layer also with an insulated top surface. The resultant structure can function, for

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example, as a vertical gate of a DRAM cell, elevated source/drain structures, or other semiconductor device feature.

FIGS. 1H and 1I (Species 1 and 2) are an example of a structure resulting from an embodiment of a method of the invention in which raised source/drain structures are fabricated by selective epitaxial growth on a surface of a semiconductive substrate adjacent to an *existing* gate (18). *In addition to Claims 1-43, 46-49 and 58-78, Claims 50-57 and 79-82* (e.g., "...providing a substrate having an elevated structure disposed thereon...") also relate to this embodiment of the method of the invention. (See also the specification at page 7, lines 18+.)

FIG. 3C (Specie 4) is an example of a structure resulting from another embodiment of a method of the invention in which a transistor including a buried drain, vertical gate, and a source region above the gate is fabricated by selective epitaxial growth. *In addition to Claims 1-43, 46-49 and 58-78, Claims 83-100* also relate to this embodiment of the method of the invention. (See also the specification at page 14, lines 7+.)

The Examiner stated that Applicant "indicated claims describing the embodiment of figure 1H as being generic in the embodiment of figure 2F."

The Examiner is respectfully mistaken. To clarify Applicant's statement regarding Figure 1H, Applicant has traversed the Examiner's identification of four groups of species. Applicant submits that Specie Group 1 (FIG. 1-H) and Specie Group 2 (FIG. 1-I) *should be combined* into a single group. FIG. 1-I is a *cross-sectional view* of the semiconductive wafer fragment depicted in FIG. 1-H, taken along line 1I-1I. The Examiner is respectfully directed to the application at page 6, lines 19-20, and page 12, lines 4-6. Accordingly, Specie 1 (FIG. 1-H) and Specie 2 (FIG. 1-I) are not distinct species and *should be combined into a single group*.

Applicant respectfully requests the Examiner's affirmation that species 1 and 2 will be properly combined into one group.

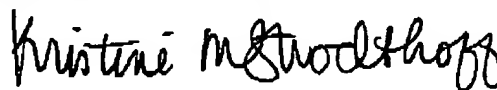
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Applicant believes that the claims are in condition for allowance, and notification to that effect is respectfully requested. The Examiner is requested to contact the undersigned attorney for application at 414/224-5814 if any questions remain.

Respectfully submitted,



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Dated: April 9, 2002

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